

We Claim:

1. A process for the production of a product comprising a carboxylic acid having  $n + 1$  carbon atoms which process comprises reacting in the liquid phase at elevated temperature and pressure a composition comprising an alcohol having  $n$  carbon atoms and/or a reactive derivative thereof, a halogen and/or a halogen compound promoter, water and carbon monoxide in the presence of hydrogen and a heterogeneous catalyst comprising a Group VIII noble metal species on a polymeric resin having a functional group selected from nitrogen-containing heterocycles.
2. A process as claimed in claim 1 wherein the alcohol is an aliphatic alcohol having 1 to 12 carbon atoms.
3. A process as claimed in claim 1 wherein the promoter is selected from hydrogen halide, an alkyl halide, aryl halide, a metal halide, ammonium halide, phosphonium halide, arsonium halide and stibonium halide.
4. A process as claimed in claim 1 wherein water is present at a concentration of 0.1 to 25% by weight based on the weight of reaction mixture.
5. A process as claimed in claim 4 wherein water is present at a concentration of 0.1 to 6.0% by weight based on the weight of the reaction mixture.
6. A process as claimed in claim 5 wherein water is present at a concentration of 0.5 to 4% by weight based on the weight of the reaction mixture.
7. A process as claimed in claim 1 wherein the hydrogen is present at a partial pressure of from 0.1 to 10 barg.
8. A process as claimed in claim 4 wherein the hydrogen is present at a partial pressure of from 0.1 to 10 barg.

9. A process as claimed in claim 5 wherein the hydrogen is present at a partial pressure of from 0.1 to 10 barg.
10. A process as claimed in claim 6 wherein the hydrogen is present at a partial pressure of from 0.1 to 10 barg.
- 5 11. A process as claimed in claim 1 wherein the Group VIII noble metal is rhodium or iridium.
12. A process as claimed in claim 8 wherein the Group VIII noble metal is rhodium or iridium.
13. A process as claimed in claim 9 wherein the Group VIII noble metal is rhodium or iridium.
- 10 14. A process as claimed in claim 10 wherein the Group VIII noble metal is rhodium or iridium.
15. A process as claimed in claim 1 in which the polymer resin is an unsubstituted or substituted imidazole.
- 15 16. A process as claimed in claim 15 wherein the polymer resin is polybenzimidazole.
17. A process as claimed in claims 1 wherein the polymer resin is a porous cross linked 4 or 2-vinyl pyridine copolymer in the free base or N-oxide form.
18. A process as claimed in claims 7 wherein the polymer resin is a porous cross linked 4 or 2-vinyl pyridine copolymer in the free base or N-oxide form.
- 20 19. A process as claimed in claims 8 wherein the polymer resin is a porous cross linked 4 or 2-vinyl pyridine copolymer in the free base or N-oxide form.
20. A process as claimed in claims 9 wherein the polymer resin is a porous cross linked 4 or 2-vinyl pyridine copolymer in the free base or N-oxide form.
21. A process as claimed in claims 10 wherein the polymer resin is a porous cross linked 4 or 2-vinyl pyridine copolymer in the free base or N-oxide form.
- 25 22. A process as claimed in claim 12 wherein the polymer resin is a porous cross linked 4 or 2-vinyl pyridine copolymer in the free base or N-oxide form.
23. A process as claimed in claim 12 carried out at a temperature of 50 to 250°C and a pressure of 1 to 500 barg G.